VM44

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Anaplasmosis in Beef Cattle [1]

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Anaplasmosis is an infectious disease of cattle, causing destruction of the red blood cells. The disease is caused by a minute parasite, *Anaplasma marginale* , found in the red blood cells of infected cattle. It may be transmitted from infected animals to healthy animals by insects or surgical instruments.

After the organism gains entry into a susceptible animal, the anaplasma parasite slowly reproduces in the animal's blood. During an incubation period of 4 to 6 weeks, the animal remains healthy and shows no signs of being infected. Finally, after the parasite has reproduced many times and established itself in the red blood cells of the animal, the body attempts to destroy the parasite. In doing so, the animal's defense system also destroys the infected red blood cells. The loss of a substantial number of red blood cells results in clinical anemia being observed in the infected animal.

Cattlemen may first notice the anemic, anaplasmosis-infected animal when it becomes weak and lags behind the herd. It refuses to drink water or eat. The skin becomes pale around the eyes and on the muzzle, lips, and teats. Later the animal may show constipation, excitement, rapid weight loss, and yellow tinged skin. The animal may fall or lie down, and be unable to rise. The affected cattle either die, or begin a recovery, one to four days after the first signs of the disease. Cattle that survive the clinical disease lose weight, abort calves, and recover slowly over a two or three-month period.

All ages of cattle may become infected with anaplasmosis; however, the severity of illness increases with age. Calves under six months-of-age seldom show enough symptoms to detect that they are infected. Cattle six months to three years-of-age become increasingly ill, and more deaths occur with advancing age. After three years of age, 30 to 50 percent of the cattle which develop clinical anaplasmosis, die if untreated.

Unless adequately medicated, cattle that recover from anaplasmosis remain reservoirs (carriers) of the disease for the remainder of their lives. The carrier animal will not exhibit any clinical signs associated with the persistent low-level *A. marginale* infection. Nevertheless, the blood from these recovered animals will cause anaplasmosis if introduced into susceptible cattle. Carriers rarely become ill with anaplasmosis a second time. The unidentified carriers in a herd are the most likely source of infection for future outbreaks of the disease.

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Anaplasmosis outbreaks are related to lack of a control program, the ratio between anaplasmosis carriers and susceptible animals in the herd, and the amount of vector transmission. (See Equation 1)

$$\text{OUTBREAKS} = \text{VECTORS} \times \text{LACK OF CONTROL} \times \frac{\text{CARRIER ANIMAL}}{\text{SUSCEPTIBLE ANIMALS}}$$

Equation 1.

An increase in the ratio of carriers to susceptible animals, or an increase in vector transmission, can influence the severity of an outbreak. When anaplasmosis is known to be in a herd, the producer needs to consider reducing vector transmission, eliminating the carrier state and instituting a control program to prevent outbreaks, and treatment or management options available to stop an outbreak of anaplasmosis.

Reducing Vector Transmission

Anaplasmosis is spread by transfer of blood from an infected animal to a susceptible one. Primarily, the transmission is "mechanical;" that is, it is transmitted by mouth parts of biting insects contaminated with *A. marginale* infected blood or by contaminated instruments used by man.

Horse flies, deer flies, stable flies and mosquitoes are known to transmit anaplasmosis "mechanically" by carrying *A. marginale* infected red blood cells from diseased cattle to susceptible cattle. In general, if more than five minutes elapses between an insect's biting a diseased animal and subsequently biting a susceptible animal, the mechanical transmission of anaplasmosis does not occur.

Cattlemen commonly transmit anaplasmosis organisms from one animal to another on dehorning saws, castrating knives, vaccinating and bleeding needles, tattoo instruments and ear notchers which are contaminated with *A. marginale* infected blood. changing needles between animals and a quick rinse of contaminated instruments in clean water or disinfectant immediately after use, will usually prevent transmission.

When man is the vector of the disease, a large number of cattle in the herd show signs of anaplasmosis four to six weeks after the cattle have been processed. The outbreak has suddenly appeared without any earlier clinical cases being observed. In contrast, when insects are the mechanical vectors of the disease, a few cases usually occur first and then are followed 4-6 weeks later by another 'wave' of clinical disease. The first cases were caused by biting insects transmitting the disease from the healthy carriers in the herd to susceptible animals. Whereas the second 'wave' of cases was caused by insect vectors carrying the disease from the earlier sick animals. The clinically ill animal is usually down, very weak and makes no attempt to fight off the biting insects. In reality, the sick animal is 'prime eating' for the blood feeding insects. The blood of a clinically-ill animal is 20 times more infective than the blood of a healthy anaplasmosis carrier.

In the past, ticks have been looked upon as one of the less-important vectors, but new information leads us to believe that ticks may be major transmitters of anaplasmosis in some areas. Researchers have demonstrated that *Dermocentor occidentalis* and *Dermocentor andersoni* ticks (The Pacific Coast tick and the Rocky Mountain Wood tick respectively) can be transmitters of the disease. The *A. marginale* parasite may be passed through several developmental stages of ticks and then transmitted to susceptible cattle. Insect Vectors that transmit disease in this manner are known as "biological vectors." Biological vectors may transmit the disease months after biting an infected animal.

Control of biting insects can quite often be frustrating and, generally, is not considered to be a practical, reliable method for totally preventing transmission of anaplasmosis. However, applications of insecticides that reduce the biting insect population will substantially reduce the number of clinical anaplasmosis cases occurring in a herd. Periodic spraying and dipping, as well as forced use of dust bags and back rubbers, are common methods of insecticide application for beef cattle.

Eliminating or Clearing the Carrier State

Anaplasmosis carrier cattle can be cured of the infection by treatment with certain tetracycline antibiotics. Carrier-state elimination programs must

include post-medication serologic testing. The animal may test positive for several months after treatment ends, but the positive-reactor's blood may not be infective. When testing, six months after treatment ceases, all test-positive reactors should be considered as "treatment failures." Failures should be retreated or removed from the herd. Animals cleared of the carrier state are again susceptible to reinfection, but these animals will exhibit resistance to clinical anaplasmosis for as long as 30 months.

A. Oxytetracycline (50-100 mg/ml): 5 day or 10 day treatment

10 mg/lb body weight daily for 5 days or 5 mg/lb body weight daily for 10 days

Intramuscular - to insure adequate absorption of the medication and prevent excessive muscle inflammation: do not inject more a 10 cc per injection site. **or**

Intravenous - Oxytetracycline should be diluted with physiological saline or administered by a veterinarian.

B. Oxytetracycline (LA-200): 4 treatments at 3 day intervals

Each animal receives 4 treatments of LA-200 at 3 day intervals at a dosage of 9 mg/lb BW. The total dose should be divided between two injection sites and given by deep intramuscular injection.

C. Chlortetracycline: 60-day treatment

Chlortetracycline fed at the rate of 5 mg/lb BW daily for 60 days will eliminate the carrier state of anaplasmosis. Oral administration permits treatment on a herd basis and the use of economical antibiotic premixes.

D. Chlortetracycline: 120-day treatment

Chlortetracycline fed at the rate of 0.5 mg/lb BW per day for 120 days will eliminate the carrier state of anaplasmosis.

Attempts to eliminate the carrier state of anaplasmosis by feeding chlortetracycline at the rate of 1 mg/lb BW every other day for 60 feedings (120 days) did not consistently rid animals of *A. marginale* infections.

NOTE : Programs for the elimination of the carrier state should be conducted AFTER the vector season has ended.